



**UNITED STATES
NUCLEAR REGULATORY COMMISSION**

REGION I
2100 RENAISSANCE BOULEVARD, SUITE 100
KING OF PRUSSIA, PENNSYLVANIA 19406-2713

July 28, 2020

Mr. Bryan C. Hanson
Senior Vice President
Exelon Generation Company, LLC
President and Chief Nuclear Officer
Exelon Nuclear
Exelon Generation Company, LLC
4300 Winfield Road
Warrenville, IL 60555

SUBJECT: LIMERICK GENERATING STATION, UNITS 1 AND 2 – BIENNIAL PROBLEM IDENTIFICATION AND RESOLUTION INSPECTION REPORT 05000352/2020012 AND 05000353/2020012

Dear Mr. Hanson:

On June 26, 2020, the U.S. Nuclear Regulatory Commission (NRC) completed a problem identification and resolution inspection at your Limerick Generating Station, Units 1 and 2 and discussed the results of this inspection with Matthew Arnao, Organizational Performance and Regulatory Director, and other members of your staff. The results of this inspection are documented in the enclosed report.

The NRC inspection team reviewed the station's corrective action program and the station's implementation of the program to evaluate its effectiveness in identifying, prioritizing, evaluating, and correcting problems, and to confirm that the station was complying with NRC regulations and licensee standards for corrective action programs. Based on the samples reviewed, the team determined that your staff's performance in each of these areas adequately supported nuclear safety.

The team also evaluated the station's processes for use of industry and NRC operating experience information and the effectiveness of the station's audits and self-assessments. Based on the samples reviewed, the team determined that your staff's performance in each of these areas adequately supported nuclear safety.

Finally, the team reviewed the station's programs to establish and maintain a safety-conscious work environment, and interviewed station personnel to evaluate the effectiveness of these programs. Based on the team's observations and the results of these interviews the team found no evidence of challenges to your organization's safety-conscious work environment. Your employees appeared willing to raise nuclear safety concerns through at least one of the several means available.

No findings or violations of more than minor significance were identified during this inspection.

This letter, its enclosure, and your response (if any) will be made available for public inspection and copying at <http://www.nrc.gov/reading-rm/adams.html> and at the NRC Public Document Room in accordance with Title 10 of the *Code of Federal Regulations* 2.390, "Public Inspections, Exemptions, Requests for Withholding."

Sincerely,

X /RA/

Signed by: Jonathan E. Greives
Jonathan E. Greives, Chief
Reactor Projects Branch 4
Division of Reactor Projects

Docket Nos. 05000352 and 05000353
License Nos. NPF-39 and NPF-85

Enclosure:
As stated

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SUBJECT: LIMERICK GENERATING STATION, UNITS 1 AND 2 – BIENNIAL PROBLEM IDENTIFICATION AND RESOLUTION INSPECTION REPORT 05000352/2020012 AND 05000353/2020012 DATED JULY 28, 2020

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**U.S. NUCLEAR REGULATORY COMMISSION
Inspection Report**

Docket Numbers: 05000352 and 05000353

License Numbers: NPF-39 and NPF-85

Report Numbers: 05000352/2020012 and 05000353/2020012

Enterprise Identifier: I-2020-012-0003

Licensee: Exelon Generation Company, LLC

Facility: Limerick Generating Station, Units 1 and 2

Location: Sanatoga, PA 19464

Inspection Dates: June 8, 2020 to June 26, 2020

Inspectors: L. Casey, Senior Project Engineer
L. Cline, Senior Project Engineer
J. DeBoer, Reactor Inspector
S. Haney, Resident Inspector

Approved By: Jonathan E. Greives, Chief
Reactor Projects Branch 4
Division of Reactor Projects

Enclosure

SUMMARY

The U.S. Nuclear Regulatory Commission (NRC) continued monitoring the licensee's performance by conducting a biennial problem identification and resolution inspection at Limerick Generating Station, Units 1 and 2, in accordance with the Reactor Oversight Process. The Reactor Oversight Process is the NRC's program for overseeing the safe operation of commercial nuclear power reactors. Refer to <https://www.nrc.gov/reactors/operating/oversight.html> for more information.

List of Findings and Violations

No findings or violations of more than minor significance were identified.

Additional Tracking Items

None.

INSPECTION SCOPES

Inspections were conducted using the appropriate portions of the inspection procedures (IPs) in effect at the beginning of the inspection unless otherwise noted. Currently approved IPs with their attached revision histories are located on the public website at <http://www.nrc.gov/reading-rm/doc-collections/insp-manual/inspection-procedure/index.html>. Samples were declared complete when the IP requirements most appropriate to the inspection activity were met consistent with Inspection Manual Chapter (IMC) 2515, "Light-Water Reactor Inspection Program - Operations Phase." The inspectors reviewed selected procedures and records, conducted plant walkdowns, and interviewed personnel to assess licensee performance and compliance with Commission rules and regulations, license conditions, site procedures, and standards. Starting on March 20, 2020, in response to the National Emergency declared by the President of the United States on the public health risks of the coronavirus (COVID-19), regional inspectors were directed to begin telework. The inspection documented below was determined that the objectives and requirements stated in the IP could be completed remotely.

OTHER ACTIVITIES – BASELINE

71152B - Problem Identification and Resolution

Biennial Team Inspection (IP Section 02.04) (1 Sample)

- (1) The inspectors performed a biennial assessment of the licensee's problem identification and resolution performance in the following areas:
 - Corrective Action Program Effectiveness in problem identification, prioritization, evaluation, and corrective action, which also included a review of corrective actions for issues identified in the Unit 1 and Unit 2 fire water systems, and the Unit 1 and Unit 2 residual heat removal and emergency service water systems in the last five years
 - Use of Operating Experience
 - Completed Self-Assessments and Audits
 - Health of the Safety Conscious Work Environment.

INSPECTION RESULTS

Assessment	71152B
Corrective Action Program Effectiveness	
<u>Problem Identification:</u> The inspectors determined that, in general, the licensee identified issues and entered them into the corrective action program at a low threshold.	
<u>Problem Prioritization and Evaluation:</u> Based on the samples reviewed, the inspectors determined that, in general, the licensee appropriately prioritized and evaluated issues commensurate with the safety significance of the identified problem. The licensee appropriately screened issue reports (IRs) for operability and reportability, categorized IRs by significance, and assigned actions to the appropriate department for evaluation and resolution.	

Corrective Actions: The inspectors determined that the overall corrective action program performance related to resolving problems was effective. In most cases, the licensee implemented corrective actions to resolve problems in a timely manner.

However, the inspectors identified one minor performance deficiency regarding the licensee's inadequate trending and corrective action for a corroded baseplate identified in the spray pond pump house in 2017. The details of the minor performance deficiency are documented in the applicable section below.

Assessment	71152B
Use of Operating Experience	
<p>The team determined that the licensee appropriately evaluated industry operating experience for its relevance to the facility. The licensee appropriately incorporated both internal and external operating experience into plant procedures and processes, as well as lessons learned for training and pre-job briefs.</p>	
Self-Assessments and Audits	
<p>The team reviewed a sample of self-assessments and audits to assess whether the licensee was identifying and addressing performance trends. The team concluded that the licensee had an effective self-assessment and audit process.</p>	

Assessment	71152B
Safety Conscious Work Environment	
<p>The team interviewed a total of 25 individuals. The purpose of these interviews was to evaluate the willingness of the licensee staff to raise nuclear safety issues; to evaluate the perceived effectiveness of the corrective action program at resolving identified problems; and to evaluate the licensee's safety-conscious work environment. The personnel interviewed were randomly selected by the inspectors from the Operations, Engineering, Maintenance, Security, and Radiation Protection work groups. To supplement these discussions, the team interviewed the Employee Concerns Program (ECP) representative to assess his perception of the site employees' willingness to raise nuclear safety concerns. The team also reviewed the ECP case log and select case files.</p>	
<p>All individual interviewed indicated that they would raise safety concerns. All individuals felt that their management was receptive to receiving safety concerns and generally addressed them promptly, commensurate with the significance of the concern. Most interviewees indicated they were adequately trained and proficient on initiating condition reports. All interviewees were aware of the licensee's ECP, stated they would use the program if necessary, and expressed confidence that their confidentiality would be maintained if they brought issues to the ECP. When asked whether there have been any instances where individuals experienced retaliation or other negative reaction for raising safety concerns, all individuals interviewed stated that they had neither experienced nor heard of an instance of retaliation at the site. The team determined that the processes in place to mitigate potential safety conscious work environment issues were adequately implemented.</p>	

Minor Performance Deficiency	71152B
<p>Minor Performance Deficiency: The team identified one minor performance deficiency due to the licensee's inadequate trending and corrective actions for a degraded residual heat removal service water pipe support base plate. During performance of Exelon surveillance procedure, ST-1-012-901-0, Spray Pond Structural Inspection, on November 22, 2017, the licensee identified a degraded pipe support baseplate, HBC-507-H162, and initiated IR 04077339 to document the identified condition. The IR stated that if the baseplate was not fixed in the near future, it could corrode to the point where the pipe support would be unable to perform its design function and that the identified condition required engineering to monitor and assess the degradation until repairs could be completed. The inspectors determined that IR 04077339 was then closed to work request 01373448, as allowed by the corrective action program procedures and that, as of the date of this inspection, no work order to complete repairs was created and no repairs were completed. The inspectors also determined that ST-1-012-901-0 was completed again on February 27, 2019, but the results of the inspection did not identify any observations or discussion of the corrosion previously identified on HBC-507-H162. The inspectors concluded that this was contrary to the procedure requirements and was a performance deficiency because: Step 4.4 required the performer to obtain a copy of the results of the last inspection and pay particular attention to areas where evidence of damage had been identified; Step 4.5 required that a written description and photograph of any damage noted during the inspection be included in the completed inspection results; and that Step 4.6 required that changes in degraded conditions from prior inspections, such as extent of corrosion, be trended until it was evident that corrosion was no longer occurring, or until corrective actions were completed.</p> <p>Screening: The inspectors determined the performance deficiency was minor. Using NRC Inspection Manual Chapter 0612, Appendices B and E, the inspectors determined the performance deficiency was minor because, although the condition of the baseplate was not documented in the February 2019 inspection and had not been corrected, based on licensee inspections of the baseplate completed on June 26, 2020, the baseplate conditions were similar to what was identified in 2017 and it remained functional. The licensee documented this minor performance deficiency in IR 04353840.</p>	

EXIT MEETINGS AND DEBRIEFS

The inspectors verified no proprietary information was retained or documented in this report.

- On June 26, 2020, the inspectors presented the biennial problem identification and resolution inspection results to Matthew Arnao, Organizational Performance and Regulatory Director, and other members of the licensee staff.

DOCUMENTS REVIEWED

Inspection Procedure	Type	Designation	Description or Title	Revision or Date
71152B	Corrective Action Documents	CAPE 04201280	D23 Lube Oil Keepwarm Failure	02/27/2019
		CAPE 04212649	D24 Emergency Diesel Generator Lube Oil leak at pressure sensing line	04/29/2019
		CAPE 04224095	Inaccurate System Availability Assessments	05/22/2019
		CAPE 04246432	Open Manway on Water box Causing Flooding during 2R15	06/08/2019
		CAPE 04335499	1N SRV Main Seat Leak	05/20/2020
		ECAPE 04193290-08	0A-P548 ESW Pump SPPH Roof Plug Lifting Eyebolt Failure	01/07/2019
		ECAPE 04202624	Limerick U1 Fuel Cladding Defect Identified by Routine Chemistry Offgas Sampling	02/08/2019
	Issue Reports (IRs)	01510494 02453874 02522420 02542205 02576904 02585422 02650502 02673386 02686844 02704781 02735374 03944364 03944871 03982133 04035159 04061086 04077339 04081882 04082181 04106334 04112004 04127674 04163928 04193458 04193541 04194270 04194843 04196295 04199902 04201128 04201812 04205949 04208628 04209746 04212993 04217125 04218660 04220123 04226368 04226462 04227982 04235661 04242429 04251477 04257856 04257953 04258142 04263306 04264194 04265494 04265645 04266423 04266929 04270530 04270530 04274846 04275140 04280018 04281729 04283856 04284354 04286381 04294685 04294907 04296755 04303755 04313201 04313899 04313985 04316600 04321933 04323304 04323304 04334999 04335036 04337850 04340911 04346095 04346159 04346343		
	RCR 04254212	Limerick Unit 2 Manual SCRAM Due to Loss of Main Condenser Vacuum	07/23/2019	
	RCR 04266201-15	Emergent Shutdown of D24 Emergency Diesel Generator due to lube oil leak from threaded connection	10/04/2019	
Corrective Action Documents	Issue Reports (IRs)	04349514 04349515 04349516 04349518 04349918 04350684 04350858 04352290 04352529 04353840		

Inspection Procedure	Type	Designation	Description or Title	Revision or Date
	Resulting from Inspection			
	Engineering Evaluations	4214904-18 Operating Experience Evaluation	ICES 447825 Diesel Generator Exhaust Fire	
		4214904-35 Operating Experience Evaluation	ICES 450628 Emergency Diesel Generator Jacket Water Leak	
		4214904-43 Operating Experience Evaluation	ICES 453406 "C" High Pressure Injection Pump failed to start during scheduled pump rotation due to bent stop pin supply breaker	
		4214904-46 Operating Experience Evaluation	ICES 453781 Instrument Air Compressor Tripped on High Intercooler Pressure	
		4214904-47 Operating Experience Evaluation	ICES 454955 Standby Temporary Diesel Powered Air Compressor Automatic Shutdown during scheduled Surveillance	
		4214904-57 Operating Experience Evaluation	ICES 460066 Control Room Refrigeration Unit Tripped on Low Suction Pressure & ICES 457968 Loss of Control Room Emergency Air Temperature Control System	
		4214904-58 Operating Experience Evaluation	ICES 461533 Instrument Air Compressor Trip	
		4214904-76 Operating Experience Evaluation	IRIS 464859 Buried Pipe Leak Results in Isolation of a fire protection header	

Inspection Procedure	Type	Designation	Description or Title	Revision or Date
		4214904-91 Operating Experience Evaluation	IRIS 471628 Service Air Compressor Tripped	
	Miscellaneous		Safety Culture Analysis - 2019 - Limerick	09/20/2019
			Nuclear Safety Culture Meeting - 11/18/2019 - Limerick Generating Station	03/16/2020
			Health Group Report (Engage Health) Limerick – 20/92/81(EDG – Diesel Generator/Fuel Oil/EDG HVAC)	05/27/2020
			Limerick Generating Station Nuclear Safety Review Board Meeting - February 19 and 20, 2019	03/14/2019
			Limerick Generating Station Nuclear Safety Review Board Meeting - February 19 and 20, 2020	03/03/2020
			Health Group Report (Engage Health) Limerick – 49/55/56(HPI - High Pressure Injection)	05/27/2020
			Health Group Report (Engage Health) Limerick – 76/77/78 (SVT - SR Ventilation)	05/27/2020
			Health Group Report (Engage Health) Limerick - 11/12 (SRW-ESW/RHRSW)	05/27/2020
	Procedures	AD-AA-3000	Nuclear Risk Management Process	5
		EI-AA-101	Employee Concerns Program	Revision 11
		EI-AA-101-1001	Employee Concerns Program Process	Revision 15
		MA-AA-716-008	Foreign Material Exclusion Program	Revision 14
		NO-AA-10	Quality Assurance Topical Report (QATR)	94
		NO-AA-210	Nuclear Oversight Regulatory Audit Procedure	Revision 10
		NO-AA-210-1001	Nuclear Oversight Audit Handbook	22
		NO-AA-210-1002	Nuclear Oversight Audit Templates	10
		PI-AA-1012	Safety Culture Monitoring	Revision 3
		PI-AA-115	Operating Experience Program	Revision 5
		PI-AA-115-1003	Processing of Level 3 OPEX Evaluations	5
		PI-AA-120	Issue Identification and Screening Process	Revision 10
		PI-AA-125	Corrective Action Program Procedure	Revision 7
	PI-AA-125-1001	Root Cause Analysis Manual	Revision 5	

Inspection Procedure	Type	Designation	Description or Title	Revision or Date
		PI-AA-125-1003	Corrective Action Program Evaluation Manual	Revision 5
		PI-AA-125-1006	Investigation Techniques Manual	Revision 4
		PI-AA-126-1001	Self-Assessments	Revision 3
	Self-Assessments	04098308	Preparation for NRC Problem Identification and Resolution (PI&R) Inspection	08/17/2018
		04219354	Operator Fundamentals	11/22/2019
		04219982	Pre-NRC Inspection Self-Assessment: Access Control, Equipment Performance, Testing/Maintenance, Training, & Performance Indicator Verification	05/16/2019
		04219984	Dewatering of Manholes	08/23/2019
		04231645	Lab Safety/Hygiene	12/31/2019
		04248960-09	Biennial Safety Culture Self Assessment	01/29/2020
		04283555	Access Authorization and Fitness for Duty	12/13/2019
		04308207	Preparation for NRC Problem Identification & Resolution (PI&R) Inspection	06/08/2020
		NOSA-LIM-19-04 (04223372)	Corrective Action Program Audit Report - Limerick Generating Station - March 25 to April 5, 2019	04/10/2019
		NOSA-LIM-19-05 (04250402)	Engineering Design Control Audit Report	08/07/2019
		NOSA-LIM-19-06 (04254186)	Radiation Protection Audit Report	07/10/2019
		NOSA-LIM-19-08 (04270127)	Operations Functional Area Audit Report	09/18/2019
		NOSA-LIM-20-01 (04307853)	Maintenance Functional Area Audit Report	03/11/2020
		NOSA-LIM-20-02 (04307787)	Security Programs Audit Report	02/12/2020
		NOSA-LIM-20-03 (04323231)	Emergency Preparedness Audit Report	04/29/2020
		NOSA-LIM-20-04 (04323264)	Chemistry, Radwaste, Effluent and Environmental Monitoring Audit Report	05/07/2020
		Work Orders	04318924-01	Completed ST-6-012-401-0 - A Loop RHRSW Pump Auto Actuation Test
	04320498-01		Completed ST-6-012-402-0 - B Loop RHRSW Pump Auto	08/11/2018

Inspection Procedure	Type	Designation	Description or Title	Revision or Date
			Actuation Test	
		04590782-01	Completed - ST-6-012-233-0, A Loop RHRSW Pump Comprehensive Test	01/17/2019
		04600953-01	Completed ST-6-012-234-0 - B Loop RHRSW Pump Comprehensive Test	02/18/2019
		04984481-01	Completed ST-6-012-231-0 - A Loop RHRSW Pump, Valve and Flow Test	02/27/2020
		05011722-01	Completed ST-6-012-232-0 - B Loop RHRSW Pump, Valve and Flow Test	05/20/2020
		05031022-01	Completed ST-6-012-452-0 - B Loop RHRSW Lineup Verification	05/18/2020
		Action Requests (ARs)	04170638 04175446 04320716 04606586 04609591 04619162 04629455 04637808 04661001 04729716 04739174 04766729 04780167 04818460 04840936 04844659 04857990 04861321 04874159 04886457 04939362 04939776 04945574 04973815 04987103 04993021	